



Hurricane Awareness Brief 2012

CDR Marn Balolong

UNCLASSIFIED COMSUBLANT Force Oceanographer



Tropical Cyclone *Quick Reference Guide* 2012

Fleet Weather Center - Norfolk, 9141 Third Ave, Norfolk VA 23511-2394

Operations Watchfloor: 757-444-7750 (DSN 564-7750)

NIPR email: fwc-norfolk.cdo@navy.mil SIPR email: fwc-norfolk.cdo@navy.smil.mil

(Public) <http://www.usno.navy.mil/NOOC/nmfc-n> (PKI) <https://nepoc.oceanography.navy.mil/portal/web/fwc>

(SIPR) <http://nepoc.oceanography.navy.smil.mil/portal/web/fwc>



Atlantic Tropical Cyclone Season: 01 June - 30 November

East Pacific Tropical Cyclone Season: 15 May - 30 November

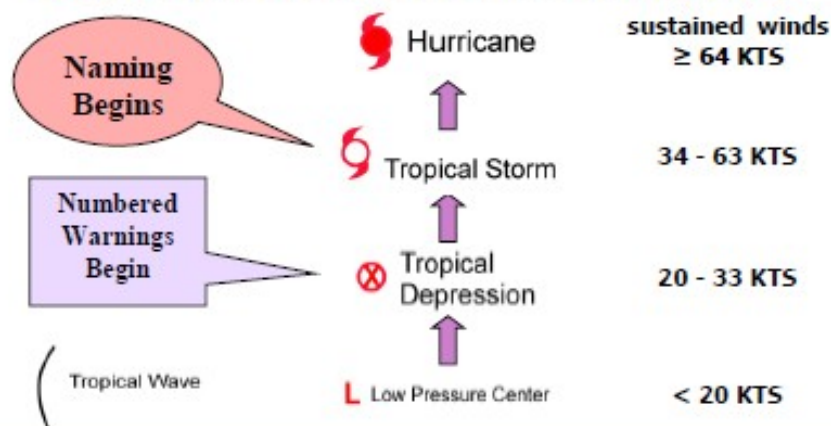
2012 Atlantic Tropical Cyclone Names

Alberto
Beryl
Chris
Debby
Ernesto
Florence
Gordon
Helene
Isaac
Joyce
Kirk
Leslie
Michael
Nadine
Oscar
Patty
Rafael
Sandy
Tony
Valerie
William

Tropical Cyclones: Development Areas and Movement



Stages of Tropical Cyclone Development



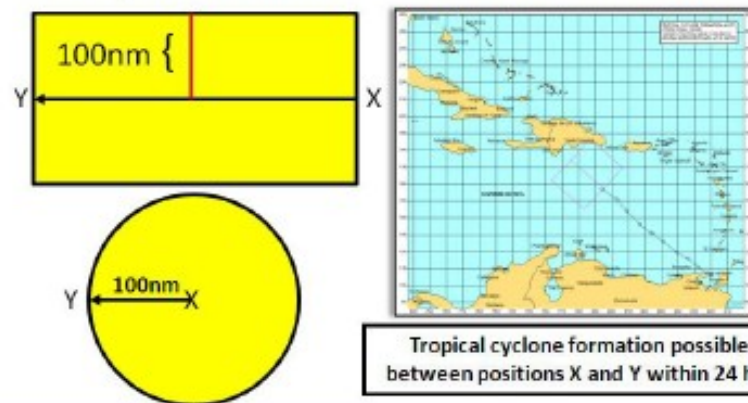
Saffir-Simpson Scale - Hurricane Destruction Potential

Category	Sustained Wind Speed (knots)	Sustained Wind Speed (mph)	Damage
1	64 - 82	74 - 95	Minimal
2	83 - 95	96 - 110	Moderate
3	96 - 113	111 - 130	Extensive
4	114 - 135	131 - 155	Extreme
5	> 135	> 155	Catastrophic

NOTE: Categories 3, 4, & 5 are considered **MAJOR** hurricanes

Tropical Cyclone Formation Alert (TCFA)

TCFAs provide early notification of likely TC development to the Fleet and help minimize the number of OTSR Advisories and Diverts





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Tropical Cyclone Conditions of Readiness (TC-CORs)

(time until the forecast onset of destructive winds*)

COR V	96 hours
COR IV	72 hours
COR III	48 hours
COR II	24 hours
COR I	12 hours

* Destructive winds are defined as sustained winds $\geq$ 50 KTS

Fleet Sortie Conditions

Charlie - Prepare to sortie within 48 hours
Bravo - Expected sortie within 24 hours
Alpha - Commence sortie to sea

Aircraft Evacuation Status Reports

(required at the following times)

72 hours
48 hours
24 hours
12 hours

Environmental Requirements for Tropical Cyclone Development

- Sea Surface Temperature $> 26^{\circ}\text{C}$ (78°F) with sufficient depth (approx 200ft) of warm water
- Pre-existing disturbance to trigger thunderstorm activity (frontal boundary, easterly wave, distal low pressure, etc...)
- Divergence at the Upper Levels (above the 400 mb level or about 24,000ft)
- Coriolis Force (Ample Planetary Vorticity) will generally be sufficient at latitudes poleward of 8 degrees North/South
- Weak ($< 20\text{kts}$) vertical wind shear between the surface and upper troposphere
- Relatively moist layers at the mid-levels (about the 700mb level / 10,000 ft)
- System embedded in a potentially unstable air mass

KEY TO TROPICAL CYCLONE WARNING GRAPHICS

The black and red lines around a projected tropical cyclone track indicate the 34-knot, 50-knot, and 64-knot wind radii associated with the storm at a given point. The outermost black line indicates the 34-knot radius; the red line indicates the 50-knot radius; and the inner black line shows the 64-knot radius. Not all tropical cyclones will have peak central winds that reach the 50-knot or 64-knot threshold; as a result, weaker storms may not have a 50-knot or 64-knot wind radius. The size of the storm's forecast wind field will be indicated by the radius of each quadrant in the associated tropical cyclone warning message.



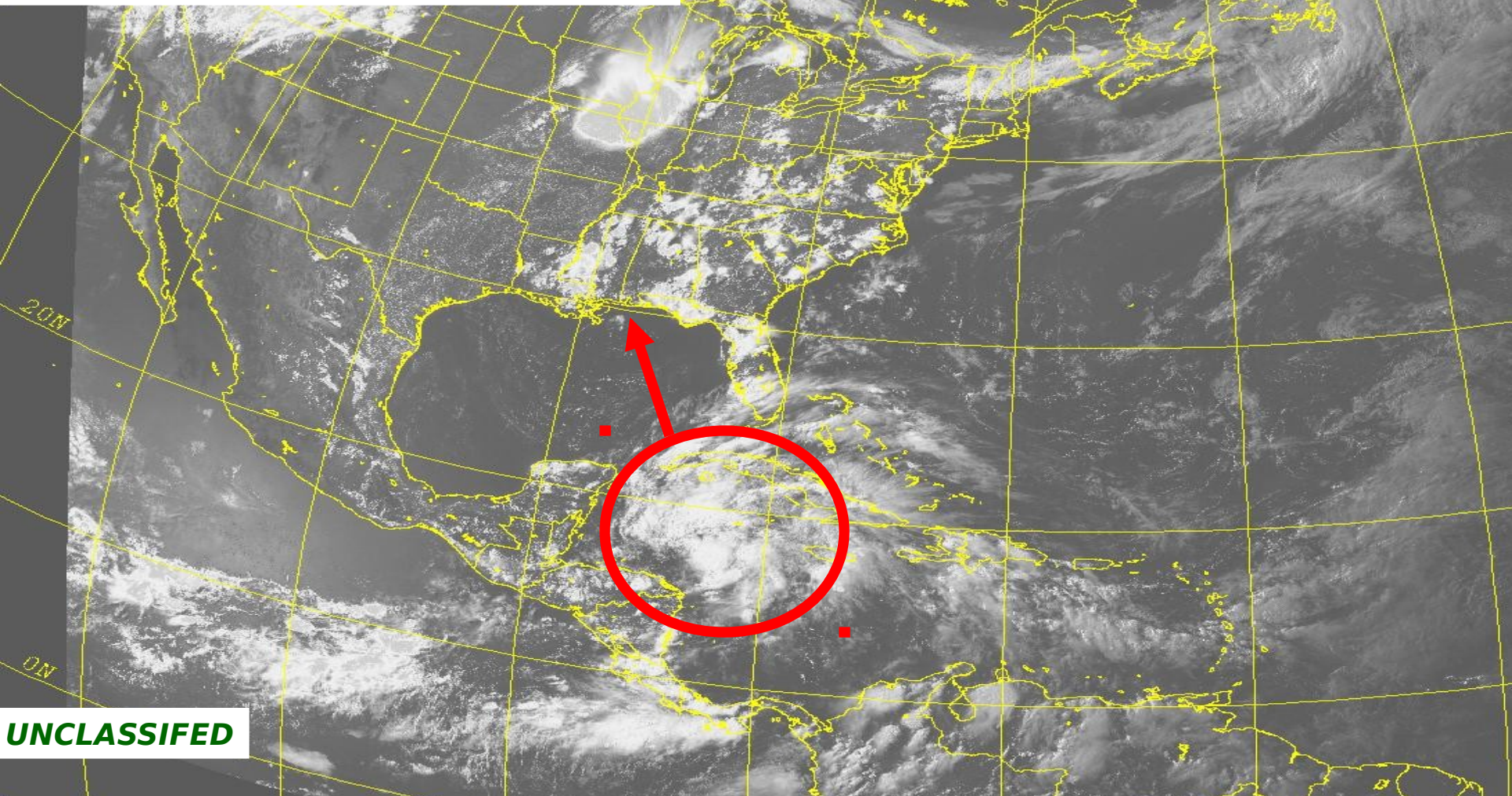
NFAAS standardizes a method for the Navy to account, assess, manage, and monitor the recovery process for personnel and their families affected and/or scattered by a wide-spread catastrophic event. The NFAAS provides valuable information to all levels of the Navy chain of command, allowing commanders to make strategic decisions which facilitate a return to stability.

NFAAS allows Navy Personnel to do the following:

- Update Contact/Location information
- Complete Needs Assessment
- View Reference Information

NFAAS Website --- <https://www.navyfamily.navy.mil>

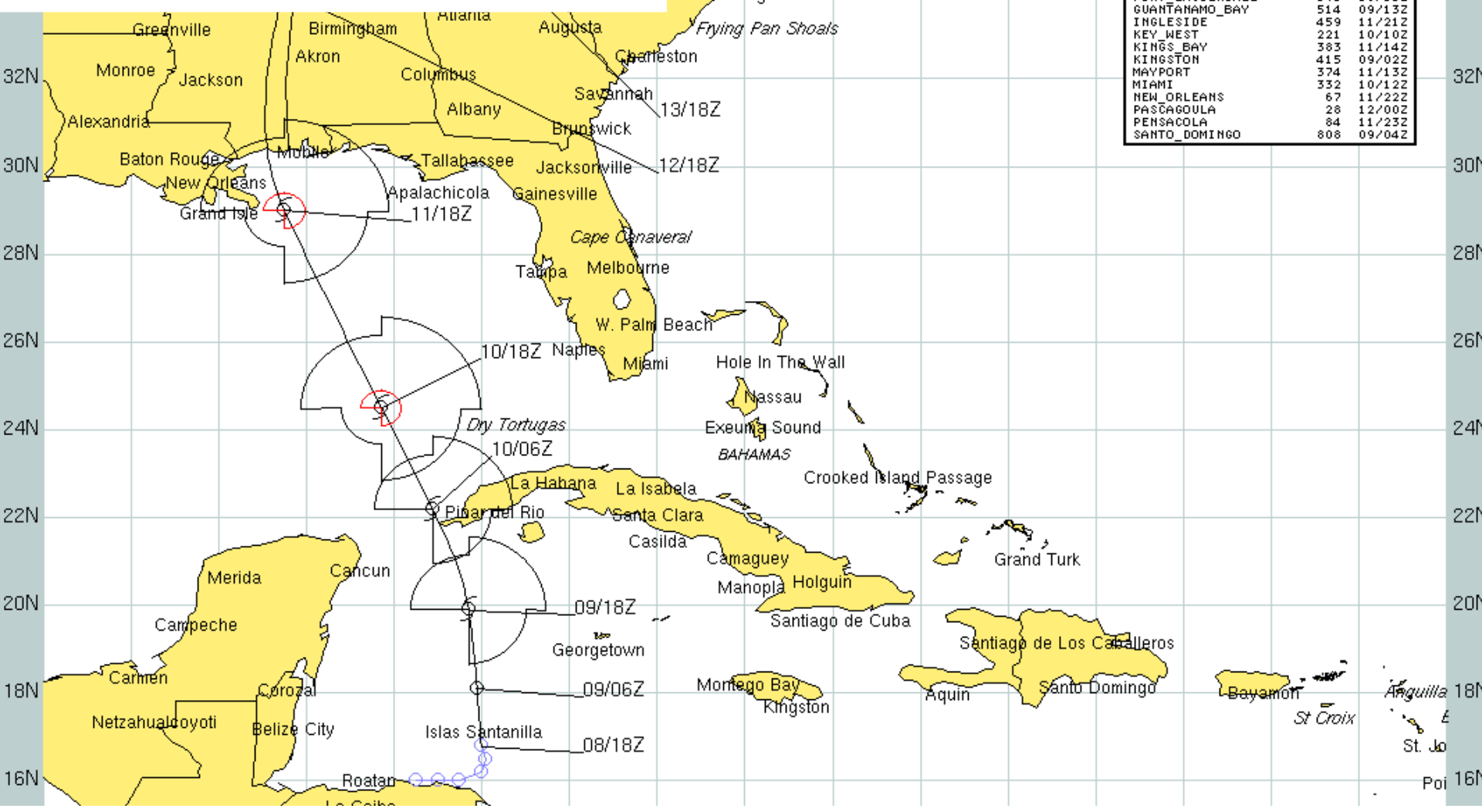
**Tropical Storm Arlene
(9-10JUN05)
NSA New Orleans went
from COR 5 to COR 3
in 12 hours.**



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Tropical Storm Arlene (9-10JUN05)

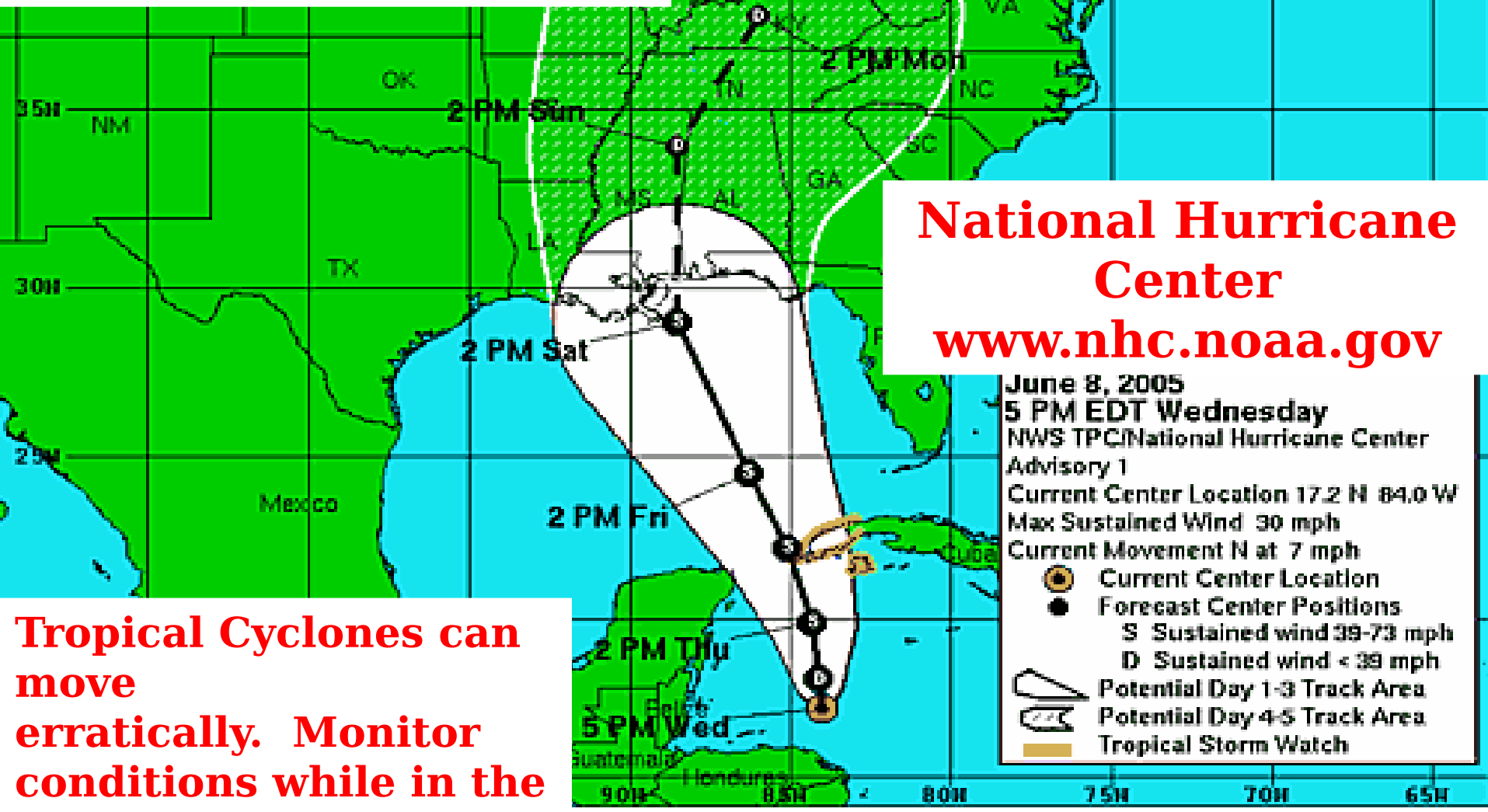
NSA New Orleans went from COR 5 to COR 3 in 12 hours.



TROPICAL DEPRESSION 01L WARNING #1
081800Z POSIT: 16.8N 84.0W
MOVING 360 DEGREES TRUE AT 06 KNOTS
08/18Z, WINDS 025KTS, GUSTS TO 035KTS
09/06Z, WINDS 030KTS, GUSTS TO 040KTS
09/18Z, WINDS 035KTS, GUSTS TO 045KTS
10/06Z, WINDS 045KTS, GUSTS TO 055KTS
10/18Z, WINDS 050KTS, GUSTS TO 060KTS
11/18Z, WINDS 050KTS, GUSTS TO 060KTS
12/18Z, WINDS 025KTS, GUSTS TO 035KTS
13/18Z, WINDS 025KTS, GUSTS TO 035KTS

CPA TO:	NM	DTG
ANDROS ISLAND	431	10/04Z
BAY SAINT LOUIS	18	12/00Z
CORPUS CHRISTI	464	11/21Z
FORT LAUDERDALE	345	10/13Z
GUANTANAMO BAY	514	09/13Z
INGLESIDE	459	11/21Z
KEY WEST	221	10/10Z
KINGS BAY	383	11/14Z
KINGSTON	415	09/02Z
MAYPORT	374	11/13Z
MIAMI	332	10/12Z
NEW ORLEANS	67	11/22Z
PASCAGOULA	28	12/00Z
PENSACOLA	84	11/23Z
SANTO DOMINGO	808	09/04Z

**Tropical Storm Arlene
(9-10JUN05)
NSA New Orleans went
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**Tropical Cyclones can
move
erratically. Monitor
conditions while in the**



Warnings issued every 6 hours

03Z

09Z

15Z

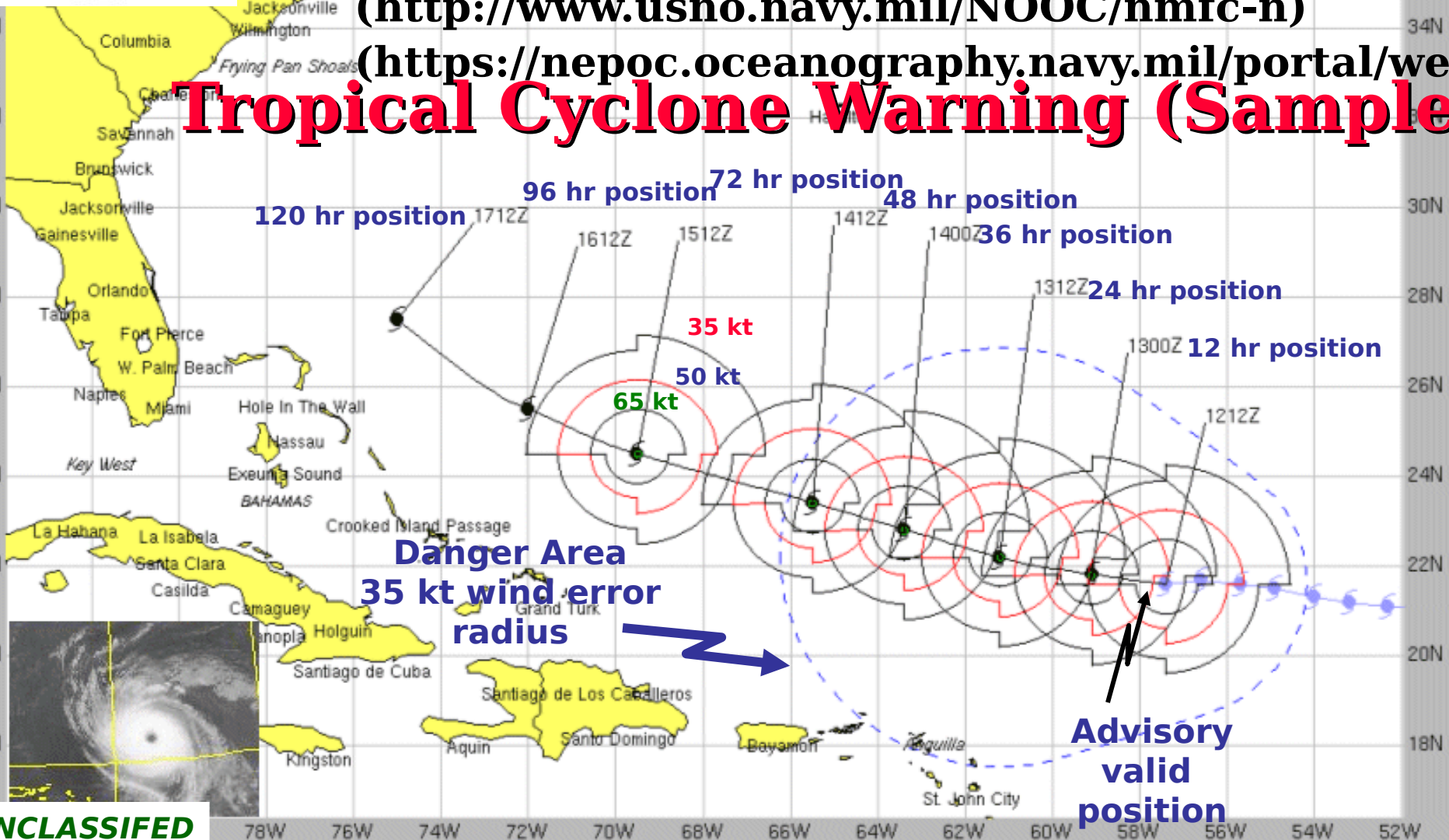
21Z

HURRICANE ISABEL (13L) WARNING #26	
121200Z	POSIT: 21.6N 57.4W
MOVING 270 DEGREES TRUE AT 08 KNOTS	
1212Z,	WINDS 140KTS, GUSTS TO 170KTS
1300Z,	WINDS 135KTS, GUSTS TO 165KTS
1312Z,	WINDS 135KTS, GUSTS TO 165KTS
1400Z,	WINDS 135KTS, GUSTS TO 165KTS
1412Z,	WINDS 130KTS, GUSTS TO 160KTS
1512Z,	WINDS 125KTS, GUSTS TO 150KTS
1612Z,	WINDS 115KTS, GUSTS TO 140KTS
1712Z,	WINDS 105KTS, GUSTS TO 130KTS

(<http://www.usno.navy.mil/NOOC/nmfc-n>)

(<https://nepoc.oceanography.navy.mil/portal/wel>)

Tropical Cyclone Warning (Sample)



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ORIGINS AND PRINCIPAL TRACKS OF TROPICAL STORMS AND HURRICANES



JUNE

ORIGINS AND PRINCIPAL TRACKS OF TROPICAL STORMS AND HURRICANES



SEPTEMBER

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ORIGINS AND PRINCIPAL TRACKS OF TROPICAL STORMS AND HURRICANES



NOVEMBER

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Hurricane Structure

Warm, humid
air spirals in
toward eye,
gaining speed
toward center.

Winds weaken
with height and
air spirals outward
clockwise at
high altitudes.

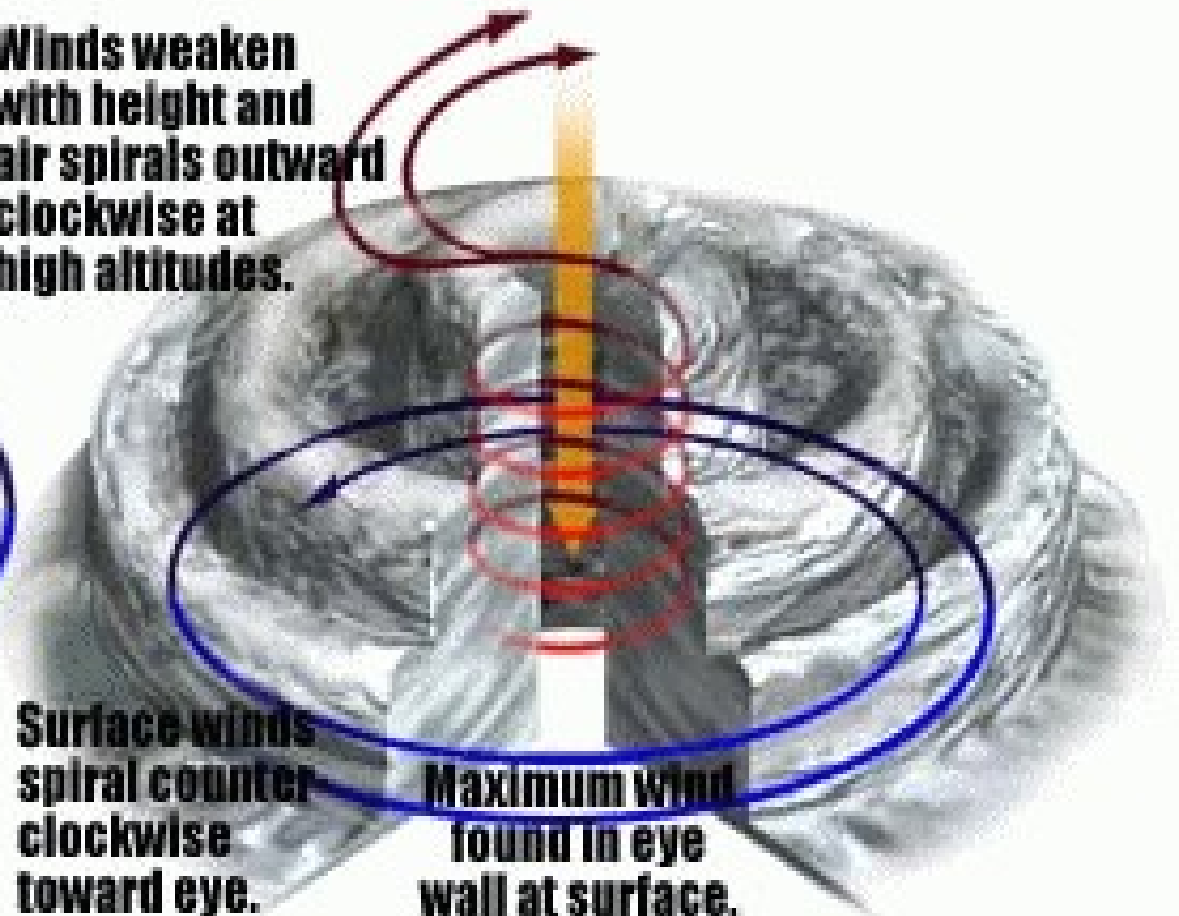


Top view

Air sinking
inside eye
inhibits clouds
and rain.

Surface winds
spiral counter
clockwise
toward eye.

Maximum wind
found in eye
wall at surface.





WHICH SYSTEM IS MORE INTENSE?



FLOYD VS. ANDREW

A SIZE COMPARISON



Tropical Cyclone Weather Phenomena

- **TORNADOES & SEVERE**



Embedded in T-storms normally form with landfall of Tropical Cyclone

- **WINDS**

Flying debris/missile hazards

Total destruction of poor constructed structures



2x4 beam driven into tree

- **TORRENTIAL RAINS/FLOOD**

Excess of 6 inches in less than 8 hrs p





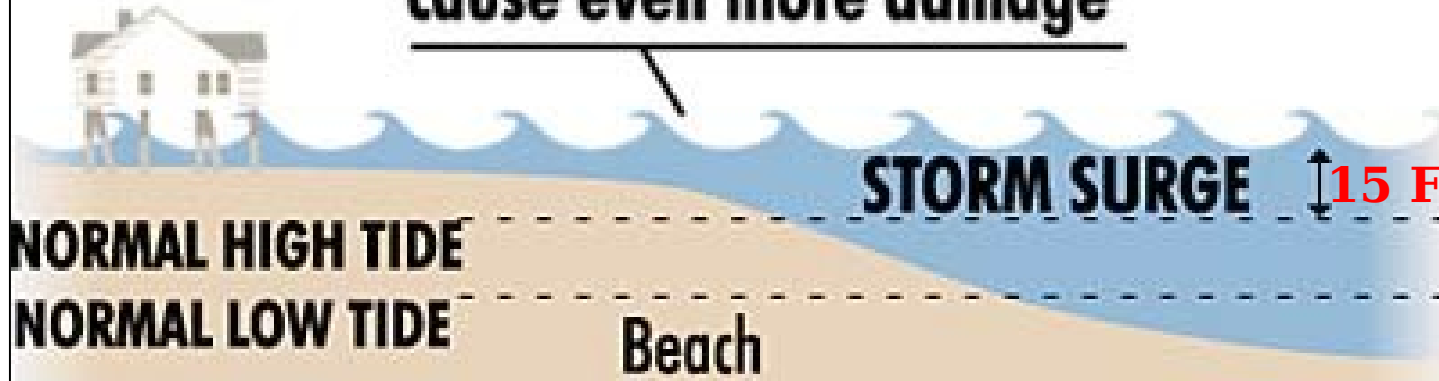
Storm Surge + Tidal



Example: Category 4 Hurricane (114-135 kts/13 to 18 ft)

surge of 15 ft + High Tide of 4 ft = 19 ft Storm Surge

Wind-driven waves cause even more damage



**19 ft
STORM TID
4 ft
HIGH TIDE**



Storm Surge

SAFFIR-SIMPSON SCALE

MEASURING STRENGTH

The National Weather Service categorizes hurricanes by intensity on a scale of 1 to 5:

Kings Bay Pier _____
Height 18FT (MLW)

Norfolk Pier _____
Height 10FT (MLW)

New London Pier _____
Height 8FT (MLW)

5

> 135 KTS
> 18 FT

4

114-135 KTS
13-18 FT

3

97-113 KTS
9-12 FT

2

84-96 KTS
6-8 FT

1

64-83 KTS
4-5 FT

20 ft

15 ft

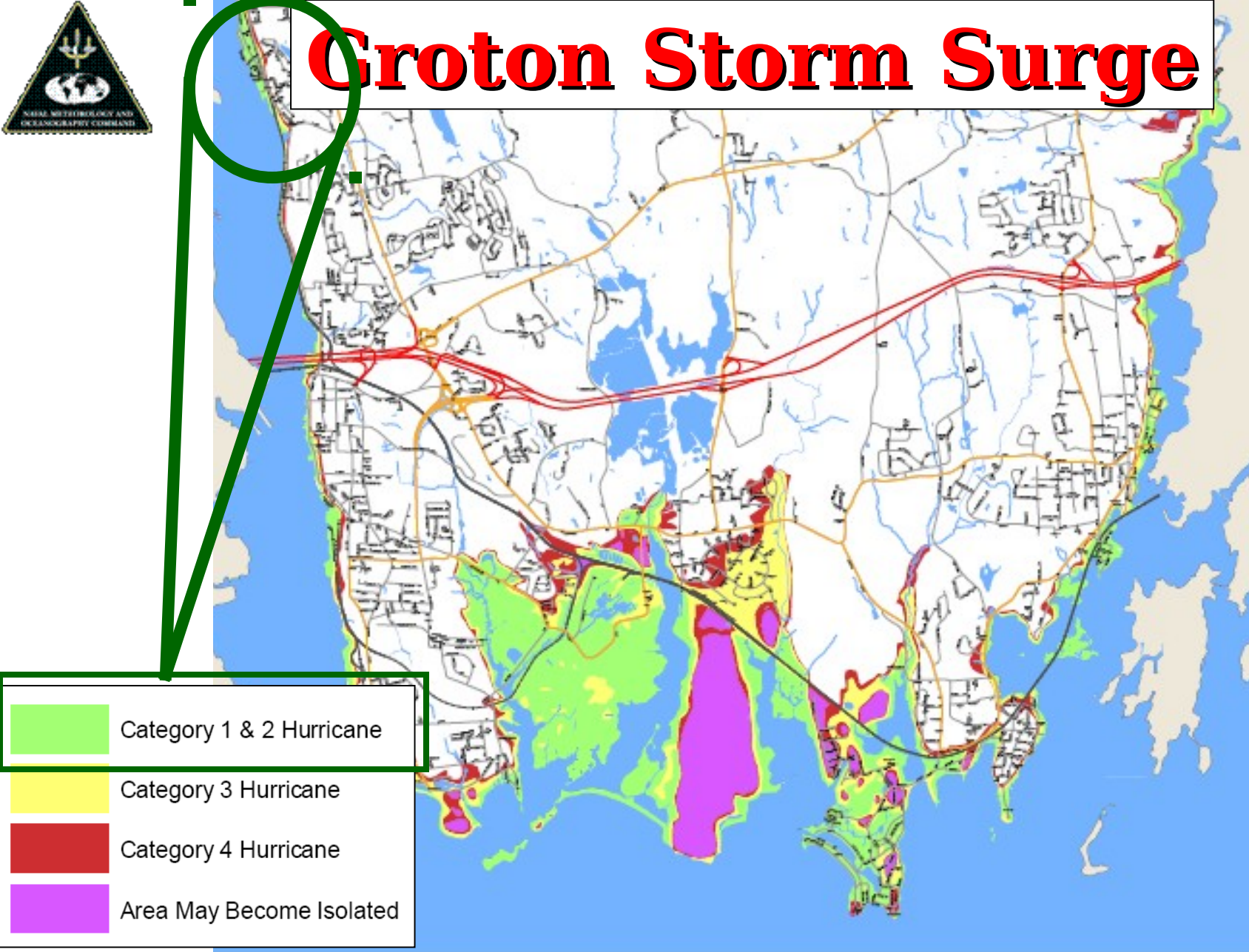
10 ft

5 ft

SEA LEVEL



Groton Storm Surge



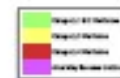
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DATE: March 24, 2009

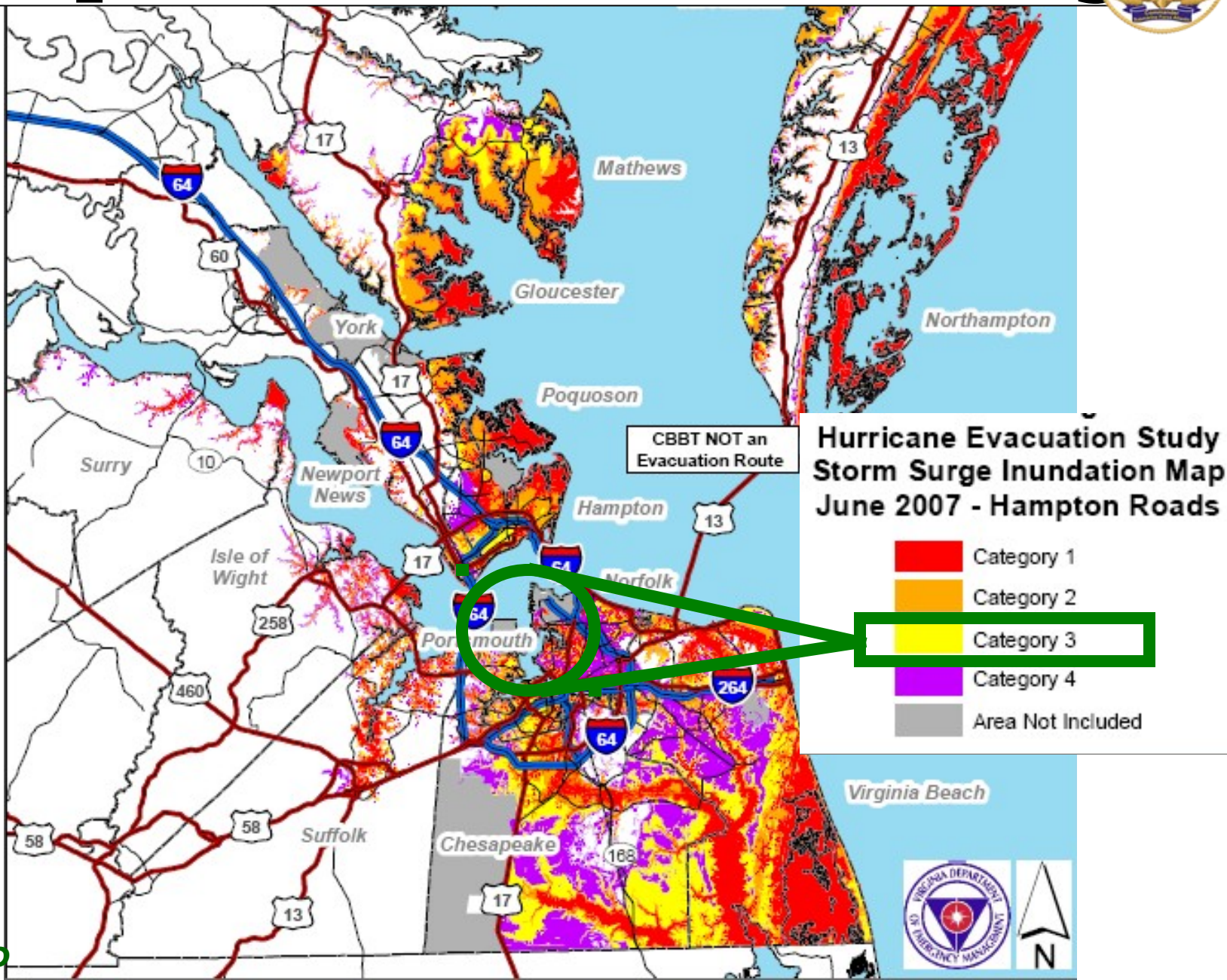
**Town of Groton
Hurricane Inundation Zones**

1:250,000 0 1,200 2,400 3,600 4,800 6,000
Feet
1 inch = 1,250 feet



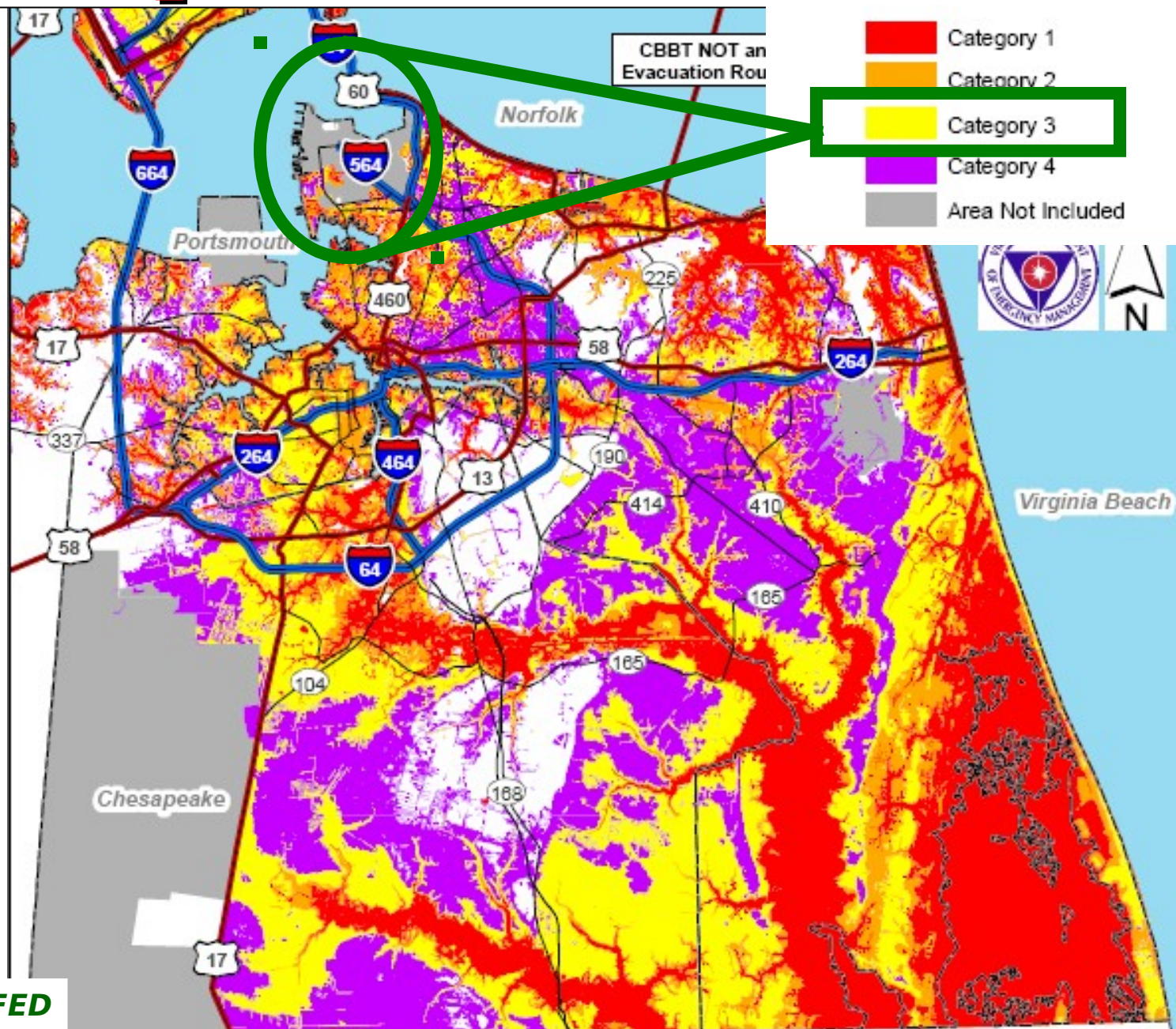


Hampton Roads Storm Surge



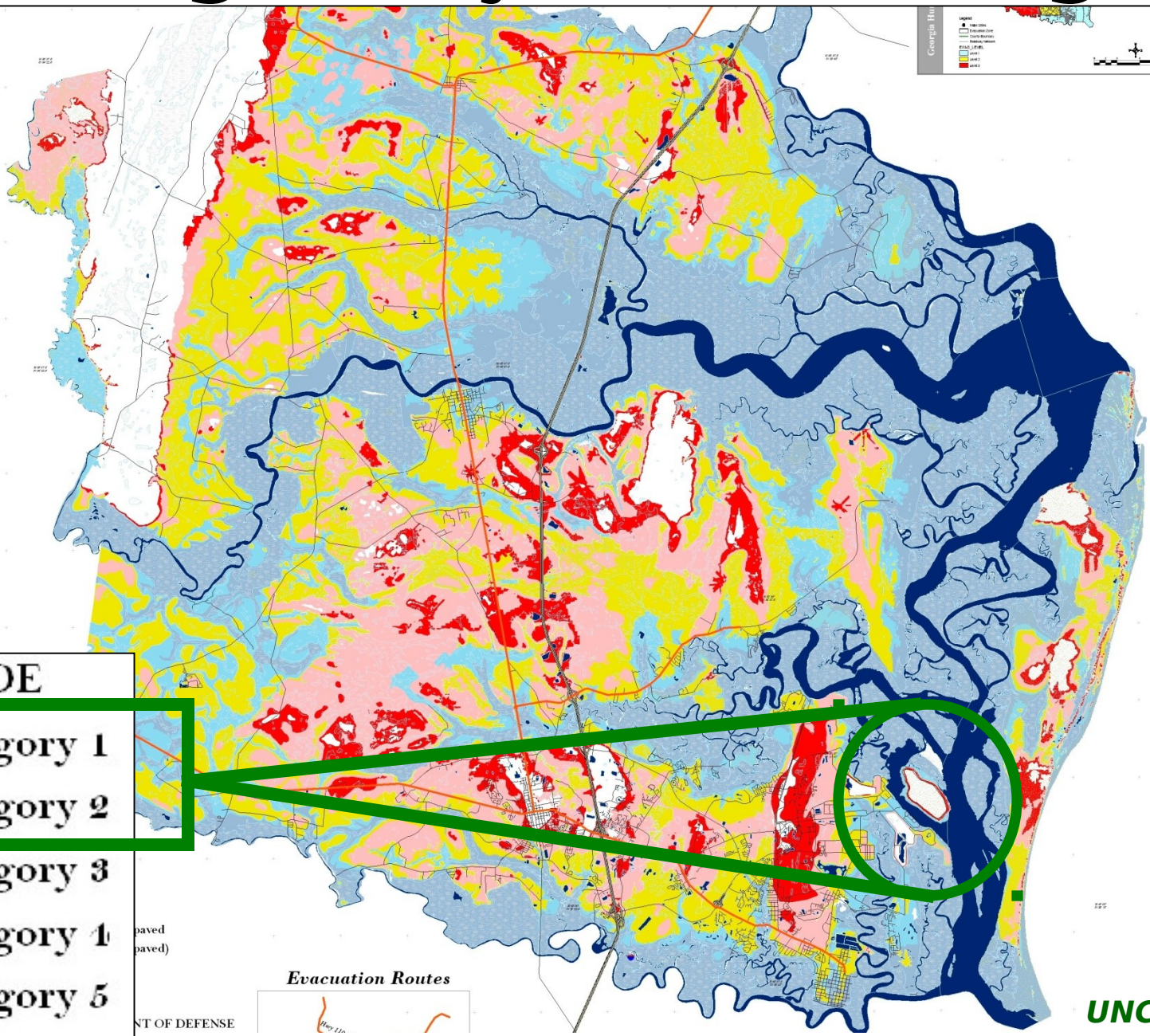


Hampton Roads Storm Surge





King's Bay Storm Surge



GRIDCODE

- Catagory 1
- Catagory 2
- Catagory 3
- Catagory 4
- Catagory 5

Evacuation Routes

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Family Disaster Kit Recommendations



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- **Water (1 gal/day/person) for 3-7 days**
- **Food for 3-7 days (non-perishable, hand can opener)**
- **Clothing**
- **First Aid Kit/Medications (Particularly for infants/elderly)**
- **Toiletries/Moisture Wipes**
- **Flashlight/Radio/Batteries**
- **“Corded” Telephone**
- **Cash with some small bills**
- **Important documents and insurance papers**
- **Tools**
- **Full gas tanks in all vehicles, plan evacuation route inland**
- **Pet care items (food, meds, evac site)**
- **If evacuated or after the storm, update status on Navy Family Accountability and Assessment System (NFAAS)**



2012 Hurricane Season

POC's

- **Fleet Weather Center Norfolk: (757) 444-7728**
 - **Forecasted Track and Intensity Graphics**
 - **Destructive Wind Forecasts**

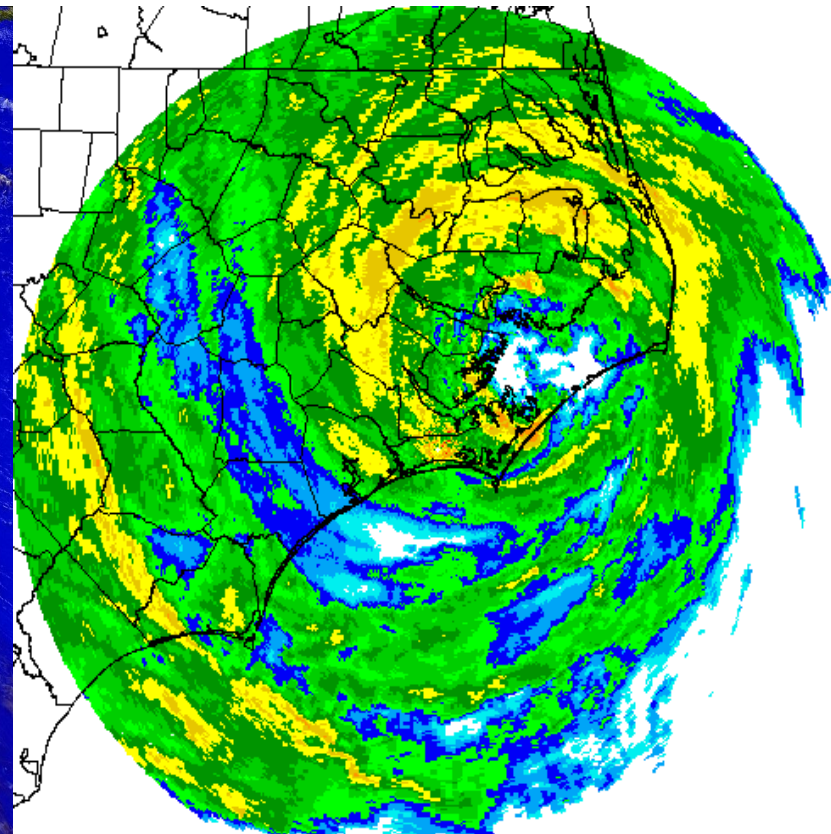
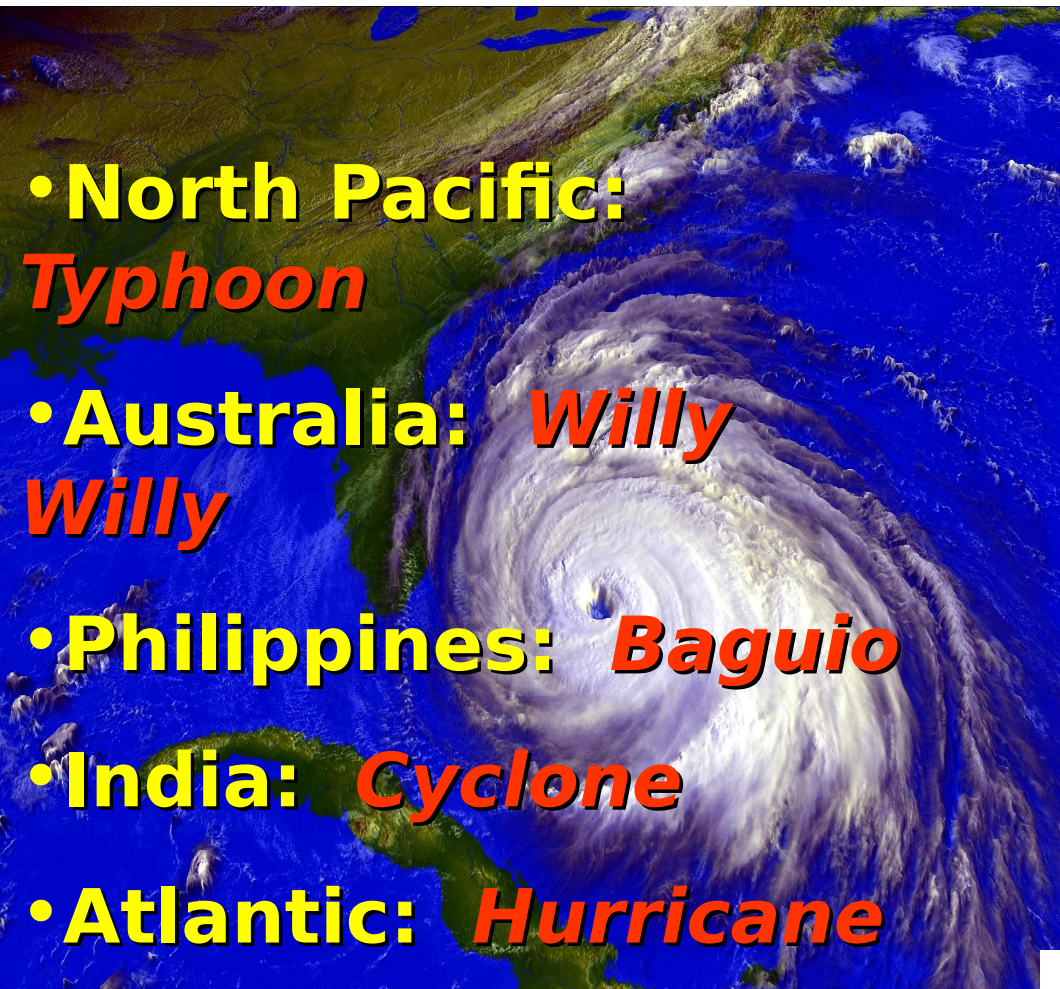
(Only if winds >35KTS are expected at Naval Installation)

<http://www.usno.navy.mil/NOOC/nmfc-n> (Public Domain)

<https://nepoc.oceanography.navy.mil/portal/web/fwcn> (PKI)
- **National Hurricane Center Website:**
www.nhc.noaa.gov
- **National Hurricane Center Disaster Preparedness:**
http://www.nhc.noaa.gov/HAW2/english/disaster_prevention.shtml



Questions?



Hurricane Isabel - 18 SEP

2003